Patent claims

1. Method of communicating digital data, comprising the steps of

cyclically transmitting frames (B) comprising

a first number of symbols according to a first keying mode (H) using a first con-
stellation,

a second number of symbols according to a second keying mode (L) using a sec-
ond constellation, whereby the first constellation includes more signalling points
than the second constellation,

the first and second keying modes (H, L) being used at predetermined positions in
the frame, whereby

both the symbols according to the first and second keying mode carry information
under at least an operative traffic phase.

2. Method according to claim 1, wherein the number of symbols sent under the sec-
ond keying mode (L) in a frame (B) amounts to 1.

3. Method according to claim 1 or 2, wherein the second constellation is a subset of
the first constellation.

4. Method according to any of claims 1-3, wherein the second constellation com-
prises at least two signalling points.

5. Method according to any preceding claim, wherein 1 symbol out of 5 - 20 in a frame
B is modulated according to the second keying mode (L).

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6. Method according to any of claims 1 - 4, wherein 1 symbol out of 20 - 100 in a frame B is modulated according to the second keying mode (L).

5   7. Method according to any of claims 1 - 6 , wherein a frame alignment word (FW) comprising a sequence of predetermined symbols, is inserted periodically after a plurality of frames (B) is being transmitted.

10 8. Method according to claim 7, wherein a frame alignment word is inserted for every 1000 - 10.000 symbols.

    9. Method according to claim 2 or any of claims 2 - 6, wherein during reception,

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        for each incoming frame, ordering incoming symbols according to their position in the frame (B),

        assigning each incoming symbol to a given field of a register (24) having a number

20   of fields (S_1- S_{t+1}) corresponding to the number of symbols (t+1) in the frame, whereby each field comprises a cumulative value, and whereby a symbol of a given frame position is assigned a field of a corresponding order number,

        updating the cumulative value of the given field in the register with a first value (-1)

25   if the respective symbol belongs to the second constellation, otherwise updating the respective field with a second value (+1),

        performing updates of multiple incoming frames of symbols,

30   from the accumulative values of the respective fields establishing at which positions in the incoming frame (B) the first, respectively the second, keying mode is used.

35 10. Method according to claim 7 or 8, wherein the frame alignment word indicates one of a predetermined group of insertion rates (Q), the insertion rate pertaining to a

predetermined rate of symbols being inserted according to the second keying or-
der mode in relation to the symbols of the first keying order mode, is used after the
frame alignment word.

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11.   Method according to claim 10, wherein the insertion rate depends on the given
       channel conditions which applies for the channel.

10   12.   Method according to claim 11, wherein the measured bit error rate at the receiver
       is used to decide which insertion rate is used for modulation.

13.   Method according to any of claims 1 - 12, wherein a weighting function (WE) in the
15   receiver is applied to an error control signal (E') for symbols coded according to
       the first keying mode (H).

14.   Method according to claim 13, wherein the error signal (WE) is reduced when the
20   detected signal (E', E) approaches the decision boundaries of the first keying
       mode (H) and wherein responses outside the detector boundaries of the given
       detected symbol of the first keying mode (H) are subdued.

25   15.   Method according to claim 14, wherein a parabolic weighting function is utilised
       inside the decision boundaries of the first keying mode (H).

16.   Method according to claim 13 - 15, wherein no weighting function is applied to
30   symbols associated with the second keying mode.

17.   Method according to any preceding claim, wherein the method is used in combina-
       tion with forward error correction coding.

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